

## Warm-up

Keiko says that the Japanese Bullet Train (Shinkansen) takes about 6 minutes to travel 30 km. Akira says that at this rate, he could travel around the world at the equator in less than 8 days.

Keiko disagrees; she thinks it will take longer.

Who is correct? Justify your response.

The circumference of the earth at the equator is approximately 40 074 km.



*The high speed Japanese Bullet Trains run on a network that joins the major cities on the island of Honshu.*

## Which is the better deal??

500 spoons @ Cosco - \$8.59

$$\$8.59 / 500 = \$0.02/\text{spoon}$$

48 spoons @ Superstore - \$1.99

$$\$1.99 / 48 = \$0.04/\text{spoon}$$

**unit price:** the cost of one unit; a rate expressed as a fraction in which the denominator is 1.

Ex. 2L Bottle of Pop       $\frac{\$0.99}{1 \text{ bottle}}$

**unit rate:** the rate or cost for one item or unit.

Ex. Gas      \$1.23/L

### Math On The Job

Terry Robichaud is the department manager of the deli at Pete's Frootique grocery store in Halifax, Nova Scotia. "Some of my duties and responsibilities are to lead and motivate staff and provide vision and planning for business growth," he says.

Terry also controls departmental finances such as wages and sales targets. "I use math to calculate prices for retail sales. From this I ensure our company achieves the appropriate profit margin on each item sold," says Terry.

Terry is considering buying a new type of samosa to sell in the deli. One wholesaler sells a box of 50 samosas for \$28.00. Another wholesaler sells a box of 75 samosas for \$41.25.

What is the unit price at each wholesaler?

What is the unit price difference between the two companies?

What factors apart from price might Terry want to consider?

## EXPLORE THE MATH

Products are packaged and sold in various sizes, such as a 1-litre, 2-litre, or 4-litre jug of milk.

How do you determine the least expensive choice?

Different brands may package their products in different sizes of packages. Brand A may sell a 250 g package of meat, while Brand B may sell a 375 g package.

Which is the better buy?

Finding the unit price will allow you to compare prices, and help you determine the best buy.

Consumer goods, such as pens or rolls of toilet paper, are often bundled together and sold in bulk. To compare the price when the quantity in the package is not the same, it is often useful to look at the unit cost of one item.

If you have a business, you may buy items in a bulk purchase that you later want to charge to your customers one item at a time.

To do this, you also need to calculate the cost of one item. A unit price is the cost of one unit. It is sometimes referred to as a unit rate.

To calculate a unit price, you can use a proportion where the second rate has a denominator of 1.

For example, if you buy a package of 4 rolls of Eco-Friendly toilet paper for \$2.68, you can calculate the cost of 1 roll by using this proportion:

Comparing unit prices can save you money at home and in the workplace. Unit price is not the only factor to consider, however. You may prefer the quality of one product over another. You may also find that there are more items in a large package than you can use. In this case, it may be a better choice to spend more on a per unit basis, and buy only what you need.

### Example 1

Rosa buys supplies for the town hall in Montague, Prince Edward Island, where she works as a clerk. She wants to buy pens. The supplier sells a box of 12 pens for \$6.25.

Calculate the unit price of 1 pen.

$$\$6.25 / 12 \text{ pens} = \$0.52/\text{pen}$$

## Your Turn

Claire picks fresh strawberries at a U-pick farm in Deep Bight, Newfoundland.

If she fills a pint basket (0.5506 litres),  
it will cost her \$1.50.  $\$1.50 / 0.5506 \text{ L} = \$2.72 / \text{L}$

If she fills a 4-litre ice cream pail,  
it will cost \$9.00.  $\$9.00 / 4 \text{ L} = \$2.25 / \text{L}$

Which size of container will give her a better buy?

1. Vikram purchases 12 sinks for his plumbing business at a wholesale price of \$1053.00.  
He wants to sell each sink to a different customer.

What is the unit price of one sink?

$$\$1053.00 / 12 \text{ sinks} = \$87.75 / \text{sink}$$

2. A horticulture technician buys lawn fertilizer for several customers. She finds the following prices: 7 kg for \$19.99; 14 kg for \$35.95; 21 kg for \$50.99.

Which package has the lowest unit cost?

$$\$19.99 / 7 \text{ kg} = \$2.86 / \text{kg}$$

$$\$35.95 / 14 \text{ kg} = \$2.57 / \text{kg}$$

$$\$50.99 / 21 \text{ kg} = \$2.43 / \text{kg}$$

3. A locksmith in Campbellton, New Brunswick, is buying locks for a new apartment building. One supplier sells locks at \$120.00 for four. Another supplier sells six for \$192.00.

Which supplier has the lower cost for one lock?

$$\$120 / 4 \text{ locks} = \$30.00 / \text{lock}$$

$$\$192 / 6 \text{ locks} = \$32.00 / \text{lock}$$

What other factors might you consider when selecting a lock?

Type of lock.

Quality of lock.

4. Joel is a salesperson in a department store that sells T-shirts individually and in packages of two or three. One T-shirt sells for \$9.98, a package of two sells for \$15.49, and a package of three sells for \$22.99.

- a) Find the unit price when T-shirts are sold in a package of two. How much is the unit price in a package of three?

$$\$15.49 / 2 \text{ shirts} = \$7.75 / \text{shirt}$$

$$\$22.99 / 3 \text{ shirts} = \$7.66 / \text{shirt}$$

- b) Suppose a customer wants to buy seven T-shirts. Which combination of packages will be the least expensive?

Two 3-packs and a single T-shirt.

5. The meat department at a large supermarket sells boneless steaks at the following prices:

- \$7.50 for 500 g;
- \$12.50 for 1 kg; and
- \$19.50 for 1.5 kg.

a) Which of these packages has the lowest unit price?

$$\$7.50 / 0.5 \text{ kg} = \$15.00 / \text{kg}$$

$$\$12.50 / 1 \text{ kg} = \$12.50 / \text{kg}$$

$$\$19.50 / 1.5 \text{ kg} = \$13.00 / \text{kg}$$

b) If a customer needs 2.5 kg, which combination of packages should he or she buy to get the best price but not have leftover meat?

A 1 kg and a 1.5 kg package.

6. A different store sells boneless steaks for the following prices:

- \$4.25 for 250 g;
- \$7.95 for 500 g; and
- \$29.50 for 2 kg.

Which of these packages has the lowest unit price?

$$\$4.25 / 0.25 \text{ kg} = \$17.00 / \text{kg}$$

$$\$7.95 / 0.5 \text{ kg} = \$15.90 / \text{kg}$$

$$\$29.50 / 2 \text{ kg} = \$14.75 / \text{kg}$$

How do these prices compare to those in question 5?

They have higher unit prices.

To Do:

Page 26 # 1 - 6 (7 for a challenge)